BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

IN THE MATTER OF
AMENDMENT TO THE COMMISSION'S
RULES TO ESTABLISH NEW
PERSONAL COMMUNICATIONS SERVICES
(GEN. DOCKET NO. 90-314)

PETITION FOR PARTIAL RECONSIDERATION

CORPORATE TECHNOLOGY PARTNERS
100 SOUTH ELLSWORTH AVENUE
9TH FLOOR
SAN MATEO, CALIFORNIA 94401
(415) 696-3244

JOHN D. LOCKTON, MANAGING PARTNER

MARCH 28, 1994

TABLE OF CONTENTS

EXHIBITS

Exhibit 1 - **Co-Existence of Personal Communication Systems with Fixed Operational Microwave Links Using Interference Sensing Code Division Multiple Access (ISCDMA) Technology, C.M. Peter Ho and Theodore S. Rappaport, September 22, 1992.**

Exhibit 2 - **Report Comparing ISCDMA and APC FAST.**

Exhibit 3 - **Report on Sharing Criteria Between FPLMTS and Other Services, CCIR Interim Working Party 8/13, July 1990.**

SUMMARY

Corporate Technology Partners ("CTP") hereby petitions the Commission for reconsideration of that portion of the Third Report and Order in General Docket 90-314 ("the Order") in which the Commission denied CTP's request for a Pioneer's Preference. On reconsideration, CTP requests that the Commission grant CTP's request for Pioneer's Preference based on CTP's development of Interference Sensing CDMA technology ("ISCDMA") and CTP's related development work on interfacing Personal Communications Services ("PCS") to passive fiber optics and utilization of Microchannel™ technology to transmit PCS signals through active cable television channels.

In its Tentative Decision and Memorandum Opinion and Order in this Docket ("Tentative Decision"), the Commission tentatively denied CTP's request for Pioneer's Preference based on two Commission findings: That the American Personal Communications ("APC")/Washington Post FAST system is superior to CTP's ISCDMA and that FAST was not derived from CTP's prior work on frequency sharing technology. Specifically the Commission stated in its ordering paragraph tentatively denying CTP's request for Pioneer's Preference:

> [W]e believe that APC has brought to fruition a superior method of frequency avoidance. We find no merit to CTP's arguments that APC's technology is derived from that developed by CTP.

Accordingly, CTP showed in its Comments and Reply Comments to the Tentative Decision that ISCDMA technology is superior to the FAST technology in all respects. For this purpose, two evaluations by independent, world class engineering firms, TSR Technologies, Inc. and LCC, Inc. were prepared with CTP and submitted to the Commission. These written submissions showed the superiority of ISCDMA in terms of cost, capacity, flexibility, ease of Commission regulation and exportability. Regarding the Commission's finding that APC/Washington Post technology was not derived from CTP technology, CTP produced a wealth of evidence showing that every major element of FAST was preceded by a similar or identical development by CTP; and showing that APC/ Washington Post was not only fully aware of CTP's prior work but even included part of CTP's work as part of one of APC/Washington Post's early Progress Reports under the APC/Washington Post experimental license.

Accordingly, in the Order the Commission did not repeat the original reasons stated in the Tentative Decision for the Commission's tentative denial of CTP's request for

Pioneer's Preference. Instead in the Order the Commission came up with three entirely new reasons for denying CTP's Request for Pioneer's Preference:

- That CTP "has yet to test its ISCDMA concept";
- That CTP's technology "lacks innovativeness"; and
- That CTP has conveyed its ownership in its technology "to another company."

Each of these Commission findings is factually incorrect, as were the earlier findings of the Commission in the Tentative Decision that FAST is superior to ISCDMA and that no elements of FAST were derived from CTP's prior work. But what is most obvious in the Order is that in supporting Pioneer's Preferences for large businesses, such as APC/ Washington Post, the Commission has largely ignored small businesses such as CTP. This Commission cant toward large business is manifested in a number of ways:

- The Commission's requirement that CTP do testing of ISCDMA rather than proving technical feasibility through written submission. This is a change in the Commission's Rules. The Commission's Rules clearly provide that technical feasibility can be shown through written submission rather than testing. The Rule change to require testing favors bigger business which can afford extensive testing of technologies and have surrounded their testing with extensive public relations efforts.

- The Commission's acceptance in each case of disagreement the allegations of a very large company, APC/Washington Post, over the allegations of a very small company, CTP. This is particularly true regarding allegations about derivation of the FAST technology. CTP carefully described for the Commission the many elements of frequency sharing technology which were developed by CTP, disclosed to APC/Washington Post, in some cases cited by APC/ Washington Post to the Commission in APC/Washington Post's own filings and then later appeared as central elements of FAST. Yet CTP's allegations of derivation were totally discounted by the Commission in favor of the simple denials of APC/Washington Post. The weight of evidence clearly favors CTP on this issue yet has been totally dismissed.

- The Commission's application in many instances of a double standard, citing every possible reason to justify its grant of Pioneer's Preference to large companies such as APC/Washington Post while citing every possible reason to justify denial of a Pioneer's Preference to CTP and other small businesses. For example, in all attacks on APC/Washington Post's technology, the APC/Washington Post rebuttals to the attacks are cited by the Commission in the Order. In the case of CTP, the attacks on CTP's technology by APC/

Washington Post are cited by the Commission but not CTP's rebuttals (which rebuttals have never been challenged by APC/Washington Post). Another example is the Commission's dismissal of CTP's technology as "lacking innovativeness" because it "is a compilation of CT-2 Plus concepts and Qualcomm's equipment.[1] The APC/Washington Post FAST technology contains more elements of CT-2 than does the CTP technology, and FAST also uses Qualcomm equipment. Another example is the Commission's citing of the transfer of an earlier CTP technology, PCI, to BCE (Bell Canada Enterprises).[2] In the same period the technology of APC came under 70% ownership of the Washington Post. A host of other examples of application of a double standard to justify denial of a Pioneer's Preference to CTP exist in the Order.

- The fact that no Pioneer's Preferences were awarded to small businesses despite the fact that a number of small businesses, such as CTP, have been leaders in development of highly innovative technology and services for PCS.

In Section 6002(a) of the Omnibus Budget Act, Congress requires the Commission to provide safeguards for small business, rural telephone companies, and businesses owned by minorities and women that would:

> Promot[e] economic opportunity and competition and ensur[e] that new and innovative technologies are readily available to the American people. (emphasis supplied)

CTP is a small business – far, far smaller than APC/Washington Post, Cox or Omnipoint. It is also a company that has developed and intends to bring forward "new and innovative technologies." To deny CTP's request for Pioneer's Preference under the facts in the record is in clear contradiction to the intent of Congress to promote small business in PCS. CTP, and perhaps one or two other small businesses which are PCS innovators, should be awarded Pioneer's Preference. These awards should be in the small business frequency Band (Band C).

---

[1]Order, paragraph 209.

[2]*Id.*

RECEIVED
APR 7 1994
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

IN THE MATTER OF	)	
	)	
AMENDMENT OF THE COMMISSION'S	)	GEN. DOCKET NO. 90-314
RULES TO ESTABLISH NEW	)	PP-51
PERSONAL COMMUNICATIONS SERVICES	)	
	)	

TO: THE COMMISSION

PETITION FOR PARTIAL RECONSIDERATION

Corporate Technology Partners ("CTP"), pursuant to Section 1.106 and of the Commission's Rules, hereby petitions for reconsideration of that portion of the Third Report and Order ("Order")[1] in this consolidated proceeding in which the Commission denied CTP's request for a Pioneer's Preference. On reconsideration, CTP requests that the Commission grant CTP's request for Pioneer's Preference based on CTP's proposal for an Interference Sensing CDMA ("ISCDMA") system and other CTP work related to interfacing Personal Communications Services ("PCS") to passive fiber optics and utilization of Microchannel™ technology to transmit PCS signals through active cable television channels.

INTRODUCTION

CTP's proposal represents a classic instance of entrepreneurial innovation by a small business whose founders have devoted most of their personal and family resources to the PCS effort for the better part of four years. CTP is truly one of those small businesses to which Commissioner Barrett has referred as having "mortgaged their homes and their lives" to develop PCS technology and service.[2]

The technology developed by CTP through much hard work, ISCDMA, has advantages in cost, capacity, flexibility, exportability and simplicity of regulation over all

---

[1]FCC 93-550, Released February 3, 1994

[2]Comments of Commissioner Barrett in this Docket at the Public Commission meeting announcing the Commission's Notice of Proposed Rule Making on Pioneer's Preferences.

other technical approaches for frequency sharing between PCS and fixed microwave transmissions. These advantages have been documented in detail to the Commission by technical submissions from two separate and independent engineering firms well known to the Commission, TSR Technologies, Inc. ("TSR") and LCC, Inc. ("LCC").[3] No other Pioneer's Preference applicant has filed two separate technical reports from distinguished independent engineering groups showing the technical feasibility of the applicant's approach and documenting its advantages.

ISCDMA is an algorithm based approach. Both the algorithms and the application of these algorithms were developed by CTP entirely on its own and are entirely unique to CTP. Other frequency sharing approaches such as the American Personal Communications ("APC")/Washington Post FAST approach are derivative of earlier approaches[4] and require expensive and complex theoretical and field propagation measurements to determine PCS channel usability. CTP's ISCDMA substitutes sophisticated algorithms for propagation measurements, thus avoiding the cost of propagation measurement and providing other advantages. As LCC said in its technical report comparing ISCDMA and FAST:

> The major difference between the two approaches is that FAST uses cumbersome and expensive propagation analysis aided by measurements to determine useable channels whereas ISCDMA is based on an algorithm which uses the data collected by real time interference measurements.[5]

LCC estimated that implementation of the FAST system throughout the U.S. would cost PCS operators as much as $500,000 million because of the expense of the required propagation analysis. LCC accordingly concluded:

> From a practical system operator standpoint, FAST is too complicated and expensive for a widescale implementation in the U.S. and abroad.[6]

CTP originally developed a system for frequency sharing based on CT-2. This system, called PCI, was jointly invented by CTP with Bell Northern Research. PCI was the first frequency sharing approach which was both fully developed and detailed to the PCS

---

[3]Copies of their engineering reports were filed as Exhibits G and M to CTP's Comments in this Docket, dated January 27, 1993, and are attached hereto as Exhibits 1 and 2.

[4]See the CCIR Interim Working Party Report of July, 1990, filed as Exhibit B to CTP's Comments in this Docket, dated January 27, 1993 and included herein as attached Exhibit 3. The CCIR Report contains most of the elements of APC's proposal including validating frequency sharing through use of exclusion zones and use of the frequency now allocated to PCS.

[5]Page 6 of LCC, Inc. study attached as Exhibit 2.

[6]*Id.*

industry. The PCI approach was developed in June, 1990 and widely disseminated to the industry in October and November, 1990. Lengthy filings on the details of PCI were submitted to the Commission and mailed to PCS companies. This included a mailing to APC/Washington Post of technical information regarding PCI. Through this dissemination, CTP was the first to show to the PCS industry the practical workability of narrow channel frequency sharing, now the preferred approach in the industry. It was also first to show the use of frequency agility and dynamic channel allocation for interference avoidance. APC/Washington Post thought enough of PCI to include a write-up on PCI in its Second Progress Report under its Experimental License, dated February 22, 1991.[7] As CTP has described in detail in its Comments and Reply Comments,[8] many elements of the APC/Washington Post FAST approach including use of frequency agility and dynamic channel allocation are identical to the earlier developed PCI work of CTP. Use of frequency agility and dynamic channel allocation for FAST were not publicly announced by APC/Washington Post and apparently were not developed by APC/Washington Post until well after CTP and Northern Telecom had broadly disseminated the details of PCI, and had sent technical information on PCI to APC/Washington Post.[9]

PCI had, however, two important drawbacks. First, it was based on CT-2. In December, 1990, CTP conducted a market study in California regarding CT-2 (the first large PCS study in the U.S.). Also CTP had access to various technical and market studies on CT-2 conducted in Canada and the U.K. These studies convinced CTP that CT-2 is an inappropriate technology platform for mass market PCS in the U.S.

Second, CT-2 is a Time Division Duplex ("TDD") technology. This creates problems in sharing frequency with fixed site microwave transmissions which use Frequency Division Duplex ("FDD"). CTP came to realize that an FDD PCS technology, with forward and reverse channels frequency offset with the same frequency offset as FDD microwave transmissions (*i.e.* 80 MHz offset), offered far more opportunity for frequency sharing.

Accordingly, in the Fall of 1990 CTP decided to abandon PCI and CT-2, and to start anew to develop a frequency sharing approach for FDD PCS technology using narrow channel CDMA. In this connection one should note that APC/Washington Post, too, started

---

[7]Exhibit L to CTP's Comments in this Docket, dated January 27, 1993.

[8]CTP Comments in this Docket, dated January 27, 1993 and Reply Comments dated March 1, 1993.

[9]As set out in CTP's Comments in this Docket, dated January 27, 1993, and in other CTP filings in this Docket, the similarity of many elements of FAST to PCI, plus the fact that the technical details of PCI were sent to APC/Washington Post, plus the fact that APC/Washington Post included PCI in its Second Progress Report, dated February 21, 1993, long before APC/Washington Post had developed elements of its FAST approach, has caused CTP to argue certain parts of FAST were derived from PCI. The evidence is circumstantial, but it appears to CTP to be inconceivable that having included PCI in its Second Progress Report, APC/Washington Post did not take from the elements of PCI in developing FAST.

with CT-2 and then abandoned CT-2 to pursue CDMA.[10] As it was no longer interested in CT-2 or PCI, CTP conveyed ownership of its PCI company, EasyPhone, Inc., to Bell Canada/Northern Telecom. CTP then turned to development of what became ISCDMA. CTP made this conveyance of EasyPhone primarily to raise money to be used in developing ISCDMA.

ISCDMA is only vaguely linked to PCI. What ISCDMA and PCI share is that they are both approaches to narrow channel frequency sharing, a technology area which CTP has been exploring since 1987.[11] Also, both involve constant measuring of interference both at initiation and during a call and use of frequency agility to change to a new channel when interfering conditions develop during a call. The major difference is that the central element of ISCDMA is use of proprietary algorithms to determine interference thresholds for non-interfering PCS channel use. This is not part of PCI. Also, as noted above, ISCDMA uses FDD whereas PCI, based on CT-2, uses TDD. Further, ISCDMA is universal in that it can be applied to most FDD PCS technology whereas PCI is limited to CT-2. Finally, ISCDMA can be configured to deal with non-standard fixed microwave deployment (*i.e.* microwave offset at other than 80 MHz or receive-only microwave).

The principal elements of innovation in ISCDMA are three:

- Use on a real time basis of algorithms rather than propagation analysis to determine whether particular channel(s) are usable from a particular location and at a particular moment of time. No other frequency sharing approach uses algorithms as does CTP's ISCDMA. Use of algorithms rather than propagation analysis avoids the cost and complexity of propagation analysis, and gains additional capacity and flexibility of system operation.

- The algorithms themselves. The CTP algorithms are unique in the sense that they provide the single viable solution to the problem of real time, interference sensing frequency sharing. The algorithms are proprietary to CTP and a major innovation by CTP.

- The ISCDMA approach for adjusting to non-standard fixed microwave transmission.

None of these elements are found in PCI or CT-2.

---

[10]However, CTP moved from a CT-2 platform to CDMA in November, 1990, much earlier than did APC/Washington Post.

[11]In 1987 Lockton, Managing General Partner of CTP, was involved in developing narrow channel frequency sharing technology allowing non-interfering transmission of data in the cellular radio spectrum. This technology became the central technology of Cellular Data, Inc. of Mountain View, California.

The innovativeness of CTP's invention is such that it is patentable, and CTP has filed for patent. Preliminary information is that a patent for CTP's Interference Sensing approach will be granted and that the patent will apply not only to Interference Sensing with CDMA but also to the general Interference Sensing approach in connection all PCS technology platforms (*i.e.* CDMA, TDMA, FDMA).

At the same time as developing ISCDMA, CTP developed two other technologies important to PCS. The first is an approach to interfacing PCS to passive fiber optics. As CTP has discussed in detail in its filings, passive fiber optics will be the technology of choice for future fiber to the curb and fiber to the home.[12] All experimentation by cable TV applicants for Pioneer's Preference have been with active, not passive fiber optics. CTP is the leader in developing approaches for interfacing PCS to passive fiber optics.

The second approach developed by CTP in conjunction with Digideck is the Microchannel™ technology allowing insertion of PCS in active cable TV COAX without interfering with picture quality. The approach was originally created by David Sarnoff Laboratories for High Definition TV and adapted by CTP, working with Digideck, for PCS. Testing of the basic approach was successfully carried out in Canada on the cable TV system of Le Group Videotron in Montreal. This technology is patented and was developed prior to the development of any similar technology by any cable TV applicants for Pioneer's Preference.[13]

In its Tentative Decision and Memorandum Opinion and Order in this Docket[14] ("Tentative Decision"), the Commission tentatively denied CTP's request for a Pioneer's Preference on two grounds: That the APC/Washington Post FAST system is superior to CTP's ISCDMA approach and that FAST was not derived from CTP's prior work on frequency sharing technology. Specifically, the Commission stated in its ordering paragraph tentatively denying CTP's request for a Pioneer's Preference that:

---

[12]CTP's Comments in this Docket, dated January 27, 1993, Exhibit H.

[13]The Commission states in paragraph 208 that CTP "pursued the concept of cable PCS well after other entities . . . ." Actually, CTP was the first to pursue an approach for insertion of a PCS transmission in a cable TV system with all channels in active use. Prior to CTP's work, the work of applicants such as Cox involved taking a cable TV channel out of use (or using an unused channel) to carry PCS. Clearly it is a major breakthrough to carry PCS signals without taking away from channel capacity of a cable TV system, and it is this important development that CTP was first to pursue.

[14]Released November 6, 1992.

> [W]e believe that APC has brought to fruition a superior method of frequency avoidance. We find no merit to CTP's arguments that APC's technology is derived from that developed by CTP.[15]

Accordingly, CTP in its Comments and Reply Comments to the Tentative Decision focused its major discussion on the issues of technology superiority and technology derivation. As mentioned above, CTP filed two extensive independent engineering reports, one prepared by TSR and the other in conjunction with LCC, which demonstrate in detail that CTP's technology is superior to the APC/Washington Post FAST system.[16] The superiority is in cost, capacity, flexibility of use, exportability and ease of regulation. In no aspect was the FAST technology found to be superior to ISCDMA. In all aspects ISCDMA was found to be superior to FAST. To CTP's knowledge, no other Pioneer's Preference applicant has submitted two separate reports from independent engineering companies validating the technical feasibility and superiority of the applicant's technology.

With regard to technology derivation, CTP traced in great detail the timing of development of PCI, ISCDMA and FAST. Among other things, CTP filed as exhibits to its Comments:[17] voluminous technical documents prepared by CTP and Northern Telecom which were sent to APC/Washington Post before development of FAST and which contained major technology elements later included in FAST, such as the narrow channel frequency sharing approach and use of frequency agility; the APC/Washington Post filing as part of its Second Progress Report, dated February 22, 1991, of materials regarding the PCI technology co-invented by CTP, which materials included description of the frequency agility feature of PCI;[18] and the July 30, 1990 CCIR Interim Working Party Report on frequency sharing which showed frequency sharing in the 2 Gigahertz range is possible and described an approach similar to FAST long before APC/Washington Post claims to have pioneered FAST.[19]

---

[15]Tentative Decision, paragraph 31.

[16]The TSR report was not prepared to compare the relative superiority of ISCDMA and FAST, as was the report prepared with LCC. Rather the TSR report was prepared to verify the technical feasibility of ISCDMA. Part of the report, however, discusses in detail the advantages of ISCDMA.

[17]Dated January 27, 1993.

[18]This was long before APC had adopted frequency agility as central to FAST.

[19]Attached Exhibit 3. In the CCIR Interim Working Party Report of July, 1990, it was concluded long before the APC/Washington Post work cited by the Commission in paragraph 35 of the Order that frequency sharing with fixed microwave is possible throughout the world including the U.S. in the 2 Gigahertz frequency range. Further, the Report concluded:

> An essential feature of the FPLMTS to facilitate sharing is that the personal stations and mobile stations are given knowledge of the local conditions so that sharing conditions are fulfilled. The base

Now in its Order we find the Commission has seemingly abandoned its original reason for denying CTP's request for a Pioneer's Preference. The Commission no longer refers directly to the alleged superiority of the APC/Washington Post FAST approach. Instead, the Commission states three entirely new grounds for denying CTP's request for a Pioneer's Preference. As none of these three grounds was mentioned in the Commission's Tentative Decision, these grounds were not directly addressed in CTP's Comments to the Tentative Decision. The three new grounds are:

- A conclusion by the Commission that CTP has not shown technology feasibility through testing. The Commission states that CTP has only developed a "concept of interference avoidance,"[20] that ". . . it has yet to test its ISCDMA concept or demonstrate whether using it will be effective in preventing interference with existing fixed microwave operations"[21] and that one of CTP's technical papers stated ". . . [f]urther work is needed . . . to test . . . reliability in an actual PCS environment."[22]

- A conclusion by the Commission that CTP's technology is not innovative. The Commission states that CTP's ". . . proposed ISCDMA is a compilation of CT-2 Plus concepts and Qualcomm's equipment and lacks innovativeness,"[23] and

- A conclusion by the Commission that CTP does not own ISCDMA. The Commission states that CTP should be denied a Pioneer's Preference because ". . . it has conveyed its ownership in its CT-2 invention to another company."[24]

---

station can be designed with knowledge of the local conditions needed for sharing and prevent operations on the fixed service channel assignments (paragraph 3 of attached Exhibit 3).

The CCIR Report was filed with the Common Carrier Bureau of the Commission in July, 1990. Only a year later did APC/Washington Post conduct its study showing frequency sharing at 2 Gigahertz is possible, and it was more than a year later that APC/Washington Post "invented" an approach (FAST) wherein base stations are designed "with knowledge of the local conditions needed for sharing" and base stations are prevented "from operations on fixed service channel assignments."

[20]Order, paragraph 209.

[21]Order, paragraph 207.

[22]*Id.*

[23]Order, paragraph 209.

[24]*Id.* The Commission also states in paragraph 209 of its Order that it finds "no support" for CTP's argument that "it developed its interference sensing approach prior to that of other interference avoidance proposals." CTP's principal argument was and continues to be that there is substantial circumstantial evidence

The result of the Commission changing the grounds of denial between the time of the Tentative Decision and the Order is that CTP has not had a due process opportunity to address the final grounds for Commission denial of CTP's request for Pioneer's Preference. Moreover, none of the new grounds that the Commission has developed to deny CTP a Pioneer's Preference are factually or legally correct. What troubles CTP the most, however, is that the Commission has clearly interpreted its Rules to the benefit of larger companies such as the Washington Post, Cox and Omnipoint, and to the detriment of small business. The Commission's requirement that extensive testing take place as a condition to award of Pioneer's Preference makes it difficult, if not impossible, for a typical undercapitalized small business ever to get a Pioneer's Preference. Favoring larger business over smaller businesses is clearly inconsistent with the express wish of Congress to benefit small business in PCS which is manifested in the Omnibus Budget Act. It is, thus, essential that the Commission reconsider its denial of CTP's request for a Pioneer's Preference. CTP must be given adequate opportunity to address the facts regarding the new grounds for denial raised by the Commission in the Order, and the Commission must interpret its Rules so as not to favor large business over small. Applying the Commission's Rules to the facts in the record, and removing all favoritism for large companies, CTP must be granted a Pioneer's Preference.

ARGUMENT

I. THE COMMISSION'S PIONEER'S PREFERENCE RULES PERMIT APPLICANTS TO DEMONSTRATE TECHNICAL FEASIBILITY BY SUBMITTING A WRITTEN SHOWING OF FEASIBILITY AND THE COMMISSION'S REQUIREMENT THAT CTP TEST IS A CHANGE IN COMMISSION RULES WHICH FAVORS LARGE COMPANIES OVER SMALL BUSINESSES SUCH AS CTP.

A. No Testing Is Required Under Commission Rules

The Commission's first stated reason for denying CTP's request for a Pioneer's Preference is that CTP has not shown technical feasibility through testing. The Commission states "that CTP has yet to test its ISCDMA concept or demonstrate whether using it will be effective in preventing interference with existing fixed microwave operations."[25] This reasoning is inconsistent with the Commission's Rules and incorrect as a matter of fact. Since the denial of CTP's request for Pioneer's Preference is based on a misconception of the record and misapplies the relevant legal standard, it should be reconsidered.

---

that important elements of the FAST approach were derived from the CTP/Bell Northern Research work in PCI, and that if APC/Washington Post is given a Pioneer's Preference, CTP must also be granted one.

[25]Order, paragraph 207.

The standards governing the Commission's consideration of Pioneer's Preferences are set forth in Sections 1.402, 1.403 and 5.207 of the Rules.[26] Under these provisions, an applicant for a preference may demonstrate technical feasibility either through a written technical submission or having commenced an experiment.[27] While the Commission has stated that the performance of an experiment will frequently be beneficial, experimental support is not "required as a prerequisite to obtaining a preference."[28]

The findings of an experiment will be a major component of the Commission's decision to grant a preference only if the applicant has relied upon an experiment rather than on a written technical submission.[29] In its Tentative Decision the Commission reiterated that its Pioneer's Preference Rules can be satisfied either by submitting a written showing of technical feasibility or conducting an experiment:

> [A] requester must have obtained an experimental license, commenced its experiment, and reported at least preliminary findings to the Commission that tend to confirm the technical feasibility of its proposal; or alternatively, a requester must have submitted a written showing that demonstrates the technical feasibility of its proposal.[30]

Indeed, in its Order the Commission reaffirmed that a written showing is sufficient for award of a Pioneer's Preference:

> The applicant also must demonstrate the technical feasibility of the new service or technology, either by submitting a technical feasibility showing or having submitted at least preliminary results of an experiment.[31]

It is thus beyond question that the Pioneer's Preference Rules do not preclude applicants who hold experimental licenses from demonstrating technical feasibility by submitting a written showing with their applications.

---

[26]47 C.F.R. §§ 1.402, 1.403 and 5.207.

[27]See Establishment of Procedures to Provide a Preference to Applicants Proposing an Allocation for New Services, 7 FCC Rcd. 1808, 1809 ¶ 11 (1992) ("Preference Reconsideration Order").

[28]*Id.* at ¶ 10.

[29]*Id.* at ¶ 11.

[30]Tentative Decision, paragraph 4.

[31]Order, paragraph 4.

CTP has submitted not just one but three technical reports showing the feasibility of ISCDMA. The first paper was submitted as part of CTP's initial request for Pioneer's Preference. The second was an independent evaluation of CTP's technology conducted by TSR.[32] Finally, with LCC there was a full review and validation of CTP's and TSR's earlier work. The report of this final technical feasibility study, conducted with the assistance of LCC, was filed by CTP as Exhibit M of its Comments.[33] What was presented to the Commission was thus a double verification of technical feasibility, a verification by TSR of CTP's prior development work and a verification of TSR's work (and that of CTP) by LCC.

The TSR report concludes by stating:

> The main advantages of ISCDMA are its quality, high system capacity, simple interference regulation and universality of services. It is clear that ISCDMA is a cost-efficient method since minimum modification of current Qualcomm technology is required and no frequency availability map is needed. Moreover, this approach provides certainty of protection for fixed microwave users, and allows co-primary or even secondary use of the 1850-1990 MHz band by a PCS system. We conclude that ISCDMA is an efficient and effective spectrum sharing technology for the emerging Personal Communications Systems. (emphasis supplied)[34]

Would TSR have put its considerable PCS reputation on the line in this lengthy and detailed technical report filed with the Commission if TSR doubted ISCDMA was technically feasible? Certainly not. The lengthy technical report prepared with LCC[35] was based on LCC's thorough review of the prior work of TSR and CTP. The Introduction to the LCC report states that:

> "[M]ajor filings by APC, CTP and other pioneer's preference applicants were reviewed and independent research was conducted."[36]

The study concludes:

---

[32]Exhibit 1 attached.

[33]Exhibit 2 attached.

[34]Exhibit 1 attached, page 21.

[35]Exhibit 2 attached.

[36]*Id.*, page 2.

> The relative advantages and weaknesses of the ISCDMA and FAST technologies have been evaluated from the standpoints of a PCS system operator as well as a fixed microwave user. ISCDMA appears to be a superior technology in all the major areas of importance to a PCS operator – cost, capacity, simplicity and reliability. It is also superior in certainty of protection for fixed microwave users and in regulatory simplicity. For these reasons, it is concluded that ISCDMA is a superior technology for PCS.[37]

Would LCC have put its considerable wireless engineering reputation on the line by participating in this lengthy report if it doubted ISCDMA is technically feasible? Certainly not. As one would expect, LCC conducted independent research to satisfy itself that ISCDMA is technically feasible before it agreed to participate in the study and report, and concluded ISCDMA is absolutely technically feasible.

No other Pioneer's Preference applicant has filed two separate reports by distinguished independent engineering firms verifying technical feasibility. To make the showing of technical feasibility indisputable, CTP had LCC review not only the original CTP work but also the TSR work reviewing the CTP work. Would the Commission now require that a fourth technical study be done verifying the LCC work, which verified the TSR work, which verified the CTP work? If the Commission's Rule with regard to acceptability of a "written showing" of technical feasibility is to have any meaning, two separate technical studies by distinguished independent engineering firms must be sufficient.

Moreover, the Commission is incorrect in concluding that "CTP has yet to test its ISCDMA concept." While the entire system has not been tested, various elements have been as can be seen reading CTP's filings under its Experimental License. Further, other elements of the system, such as use of frequency agility/dynamic channel allocation for interference avoidance have been shown to be feasible as part of operating technologies such as CT-3 in Canada.

The burden of proof of technical feasibility is indeed on the applicant for Pioneer's Preference. However, with two independent engineering reports validating technical feasibility, with the testing CTP has completed and with no independent engineering work of any kind that has cast doubt on technical feasibility, it is legally and factually incorrect for the Commission to decide on its own recognizance that ISCDMA has not been shown to be technically feasible. CTP's Petition for Reconsideration should accordingly be granted; and on the basis of CTP's "written showing" of technical feasibility, CTP's request for Pioneer's Preference should be granted.

---

[37] *Id.*, page 19.

B. In Requiring That CTP Test And Rejecting The Sufficiency Of CTP's Written Technical Submissions The Commission Is Changing Its Rules To Favor Big Business Over Small Business.

In Section 6002(a) of the Omnibus Budget Act, Congress requires the Commission to provide safeguards for small business, rural telephone companies, and businesses owned by minorities and women that would:

> promot[e] economic opportunity and competition and ensur[e] that new and innovative technologies are readily available to the American people. (emphasis supplied)

CTP is clearly a small business, far, far smaller than APC/Washington Post, Cox and Omnipoint. CTP has never involved more than three people. For a substantial time, it had only two people. We have operated since 1989 largely without pay. We have used our own savings and borrowings from our families to finance the PCS effort. And all of our filings, this Petition included, have been prepared by us. In total, almost $1.5 million in cash and non-financial resources (largely "sweat equity") have been expended by CTP on PCS.

CTP, located outside San Francisco, has not been able to afford all the Washington visits and ex-parte contacts with the Commission engaged in by APC/Washington Post, Cox and Omnipoint. It has not been able to afford polished briefs answering every point with the legal art of the high priced lawyer. And most important, it has not been able to afford high priced, folderol surrounded testing with staged PCS calls to the Chairman of the FCC and similar publicity stunts. Instead CTP has proceeded in quiet, entrepreneurial fashion to compile a lengthy list of substantial innovations and other contributions to the PCS industry. CTP is precisely the kind of small business that Congress intended be safeguarded in its provision of "new and innovative technologies." The Record regarding CTP includes:

- First U.S. company involved in CT-2/PCS. Led in preparing British Telecom successful U.K. CT-2 license application - Summer, 1988.
- First to introduce CT-2 and PCS to many U.S. RBOCs and other present PCS industry participants - private meetings, Fall/Winter, 1988.
- First to introduce CT-2/PCS to the FCC. Letter to Dr. Thomas P. Stanley - January 31, 1989.
- First to introduce PCS to the U.S. Cellular Radio Industry - address to the Technical Committee of CTIA - February, 1989.

- In recognition of CTP's pioneering work, CTP (Lockton) invited by Commission on first Commission sponsored panel on PCS - "The Future of Personal Mobile Communications" - July, 1989.

- First to set up a PCS company in the U.S., EasyPhone, Inc. - Summer/Fall, 1989.

- First to conduct an extensive U.S. study on PCS in the market - Fall/Winter, 1989.

- CTP co-invents frequency sharing approach with fixed microwave involving use of frequency agility/dynamic channel allocation of CT-3 (*i.e.* PCI) - June, 1990.

- First to file for an experimental license for the purpose of testing a detailed, fully specified frequency sharing technology - September 14, 1990.

- First to widely disseminate to the PCS industry (and to file with the Commission) a detailed, fully specified frequency sharing technology embodying use of narrow channels, frequency agility and dynamic channel allocation - October/November, 1990.

- First to develop the idea of using narrow channel CDMA (rather than CT-2), frequency agility and dynamic channel allocation for an interference sensing approach to frequency sharing - November, 1990.

- First to develop an approach to frequency sharing which allows algorithms thus avoiding the expensive theoretical and field propagation analysis required in exclusion zone approaches such as FAST - Spring, 1991.

- First to develop an approach allowing non-interfering insertion of PCS transmissions into active cable TV channels without the need to remove a channel from service and devote it to PCS - Spring, 1991.

- First to develop an approach to interface PCS and passive fiber optics for lowest cost and greatest flexibility of signal delivery - Fall/Winter, 1992.

- First successful test of interface of PCS to passive fiber optics - Summer, 1992.

- First to file with the Commission two separate technical submissions by independent engineering firms verifying the technical feasibility and superiority of a technology for which Pioneer's Preference is sought - Summer and Fall, 1992.

CTP has proceeded with this work in faith that the Commission will treat small business fairly alongside large business. Without the wherewithal to do extensive testing, CTP has instead relied upon the Commission Rules allowing "written submissions" to show technical feasibility. Now CTP is being denied a Pioneer's Preference because CTP ". . . has yet to test its ISCDMA concept . . ."[38] Requiring testing rather than "written submissions" changes the Commission Pioneer's Preference Rules to favor large business. Large business can afford to test extensively. Small businesses can't, and must rely largely on written submissions. With two separate written submissions by independent engineering firms showing technical feasibility, CTP has clearly met the "written submission" requirement. More should not be required of a small business.

From everything that has happened it is readily obvious that CTP has not been safeguarded as a small business as Congress intended. A reading of all the filings in this Docket shows that CTP's technology is superior to that of APC/Washington Post, has been shown to be technically feasible and has in many important ways preceded the development of the APC/Washington Post FAST technology. Much of these CTP filings seem either to have been ignored, or incorrect allegations by APC/ Washington Post accepted instead of CTP's contrary allegations. It is respectfully submitted that had CTP been a large business and had it surrounded its PCS work with active public relations, lobbying and highly publicized testing, it would now have a Pioneer's Preference. It is further respectfully submitted that denial of a Pioneer's Preference to CTP under these circumstances is in clear conflict with the wishes of Congress to provide for small business in PCS. Indeed, the fact that no small businesses have been awarded Pioneer's Preferences, despite the fact that many small businesses have been substantial contributors to PCS, seems to prove a definite cant by the Commission in favor of large businesses in the Pioneer's Preference process.

What should be done is that at least as many Pioneer's Preferences should now be given to small businesses as to large businesses (*i.e.* at least three Pioneer's Preferences). The small business Pioneer's Preferences should, however, be given in the BTA frequency band (*i.e.* Band C). Based on CTP's written technical submissions, CTP should be awarded one of these Pioneer's Preferences.

---

[38]Order, paragraph 207.

C. Not A Concept But A Full Technical Showing Was Presented To The Commission.

In denying CTP's request for a Pioneer's Preference, the Commission concludes that ISCDMA "is only a concept." Webster's Dictionary defines the word "concept" to mean:

> An idea, especially a generalized idea; a thought; a general notion.

There is nothing in the record to support the Commission's conclusion that ISCDMA is only a concept, a generalized idea, a thought, a general notion. CTP has filed 100 pages of detailed technical documents with the FCC, including studies verifying the feasibility of the technology prepared in conjunction with two independent engineering groups, TSR and LCC. It has filed almost 1,000 pages of additional materials supporting the feasibility of the technology. Patent is pending on the technology, and the preliminary indication is that the patent will be granted. Patents aren't granted on concepts. Patents are granted for workable inventions.

Since the Commission conclusion that CTP has developed "only a concept" is clearly based on a misconception of the record, this conclusion must be reconsidered. CTP's Petition for Reconsideration must be granted and based on the fact that CTP has presented a full technical showing, not a concept, CTP's request for Pioneer's Preference must be granted.

D. Cited Comments By Other Applicants Are Either Irrelevant Or Have Already Been Shown To Be Fallacious.

In its Order, the Commission cites comments by other Pioneer's Preference applicants regarding ISCDMA and CTP's development effort.[39]

Regarding Qualcomm,[40] of course CTP did not invent CDMA, and CTP has never claimed it did so. Also as cited, there are, of course, other somewhat similar ideas for frequency sharing, FAST being one. CTP's approach differs, however, from all other approaches in that algorithms rather than propagation mapping is used. By employing algorithms rather than propagation mapping, the advantages of lower cost, higher capacity, system operation flexibility, exportability and ease of regulation listed in attached Exhibits 1 and 2 are obtained. Qualcomm acknowledged in its filing with the T1 committee on PCS technology that the appropriate frequency sharing

---

[39]Order, paragraphs 199, 200, 201 and 205.

[40]Order, paragraph 199.

approach for Qualcomm CDMA is "to test and identify co-channel interference conditions, and to implement algorithms for hard hand-off between CDMA channels."[41] It is these algorithms that CTP, not Qualcomm, has developed.

Regarding PacTel,[42] GTE[43] and Viacom,[44] none of these companies had reviewed CTP's technical reports when they made the comments cited by the Commission. No further critical comments have been advanced by these applicants after CTP filed its technical reports. Hence the comments cited are not relevant to the issue of technical feasibility. With regard to the cited GTE assertion that there has "not been a significant investment of effort" by CTP, we note that CTP has spend almost $1.5 million in cash and people resources over four years working on PCS development. This is a far more significant commitment by CTP in terms of the total assets of CTP, and in terms of the assets of its founders (who worked more than three years on PCS without pay), than is the case for GTE or for most other PCS Pioneer's Preference applicants.

With regard to the cited allegations of Viacom, they are just plain wrong, as it is easily seen by reading attached Exhibits 1 and 2. Viacom did not understand the CTP technology when it made its allegations and had not reviewed CTP's technical reports.

Regarding APC/Washington Post,[45] APC/Washington Post chose to wait until March 1, 1993 and the very last document to be filed in this Docket before attacking the workability of CTP's technology.[46] APC/Washington Post apparently thus sought to be able to attack CTP's technology without giving CTP a chance for rebuttal. As a result, CTP filed with the Commission a Motion For Leave To File Further Reply.[47] Then APC/Washington Post filed an additional letter[48] with the Commission again raising new allegations. As a result of this letter, CTP was forced to file

---

[41]CTP Comments in this Docket, dated January 27, 1993, pages 17 and 18, footnote 28.

[42]Order, paragraph 200.

[43]*Id.*

[44]Order, paragraph 201.

[45]Order, paragraph 205.

[46]APC/Washington Post Reply, dated March 1, 1993.

[47]Dated March 12, 1993.

[48]Dated March 24, 1993.

a second motion, a Motion for Leave to File Reply To APC.[49] APC/Washington Post did not oppose either CTP's Motion For Leave To File Further Reply or Motion For Leave To File Reply To APC.

In CTP's Further Reply Comments and Reply to APC/Washington Post attached to these two motions, CTP showed that:

- Contrary to the APC/Washington Post assertion, ISCDMA does "continuously monitor and adjust frequency use" and does handle the situation "when a subscriber moves from behind a building." APC/ Washington Post had simply not read CTP's filings carefully. Nor, it appears, has the Commission fully comprehended CTP's filings.[50]

---

[49]Dated April 1, 1993.

[50]In paragraph 33 of the Order the Commission states:

> We conclude that APC's FAST is significantly different from CTP's ISCDMA, particularly in that it continues to monitor the channel and can adjust frequency after call set up.

This is a totally incorrect characterization of ISCDMA. CTP has always made it clear to the Commission that CTP's interference sensing approach not only involves sensing at initial call set up but also continuous monitoring and adjustment of frequency use. This was set out in CTP's original May 4, 1990 Request for Pioneer's Preference wherein CTP stated:

> If the user of the subscriber terminal later comes into an area where interference exists (*i.e.* in range of a fixed microwave transmission), this is recognized by the scanner in the subscriber unit and a dynamic channel allocation occurs. (CTP's Request for Pioneer's Preference, GEN. Docket 90-314, No. PP-51, filed May 4, 1992, p. 13.)

Similarly in its Comments, CTP states an attribute of ISCDMA is:

> Continuing measurement for change in signal strength such as to require a frequency agile move to a better channel either in cell or to a new cell. (CTP's Comments, GEN. Docket 90-314, No. PP-51, filed January 27, 1993, p. 39.)

ISCDMA was specifically designed to take advantage of the constant monitoring of pilot channels that is a built-in feature of QUALCOMM CDMA PCS subscriber terminals. As explained in Exhibits G and M to CTP's Comments, filed January 27, 1993, pilot channel monitoring is used by ISCDMA to determine interference from fixed microwave transmitters. (The measured interference on pilot channel is used together with CTP's proprietary algorithms to determine potential interference to fixed microwave transmission from the summed power of the PCS system.) Specifically, CTP has stated to the Commission:

> For interference sensing through pilot channels to give adequate protection to microwave users, pilot channels must become unusable (upon power on scanning or upon movement of subscriber terminal into interfering zone) at a threshold where the fixed microwave user is assured no detectable interference will occur to the fixed microwave transmission. (emphasis added) (CTP's

When CTP pointed out to APC/Washington Post in CTP's Reply Comments that CTP's technical filings showed ISCDMA involved continuous monitoring, APC/Washington Post did not renew its allegations in this regard. Indeed, it is absurd to imagine that companies with as much technical knowledge and involvement with PCS as CTP, TSR and LCC (and earlier Bell Northern Research with PCI) would make such a stupid technical mistake as only to provide monitoring at call set-up, not continuing monitoring. The CDMA technology CTP uses as its platform for ISCDMA has continuing monitoring.

- Contrary to the assertion of APC/Washington Post, ISCDMA does "protect microwave operations that use other than an 80 Megahertz frequency separation" and does "protect receive-only microwave stations." Again, APC/Washington Post failed to read CTP's filings. CTP had filed a detailed technical discussion of how ISCDMA would be adapted to non-standard offset and receive-only microwave stations. When CTP pointed out to APC/Washington Post in CTP's Reply Comments that CTP has filed technical detail regarding using ISCDMA with non-standard offset and receive-only microwave, APC/ Washington Post did not renew its allegations in this regard.

- Contrary to the assertion of APC/Washington Post, CTP can "take credit for the technical filings of EasyPhone, Northern Telecom, and Bell Northern Research." CTP was the co-inventor of PCI, and most, if not all, of the filings made with the Commission regarding PCI were reviewed or prepared by CTP.

In citing the APC/Washington Post allegations regarding CTP and not mentioning CTP's complete rebuttal of these allegations, a double standard appears to be applied. When the Commission cited attacks on the APC/Washington Post technology in the Order, it also cited APC's rebuttal. CTP's rebuttals are never cited in the Order but only the APC/Washington Post attacks.

As the Commission appears to have relied at least in part on the cited allegations of PacTel, Viacom, GTE and APC/Washington Post, and as the record clearly does not support these allegations, CTP's Petition for Reconsideration should be granted, and based on the full record, CTP's request for Pioneer's Preference should be granted.

Reply Comments, GEN. Docket 90-314, No. PP-51, filed June 25, 1992, Exhibit 1, p. 8.)

E. A Suggestion In The Second Of Three CTP Technical Reports That Testing Take Place Is Not Grounds For Denial Of Pioneer's Preference.

There are two reasons for testing - to develop a technology or to implement a technology which has been developed through research and other work. The testing suggested by TSR in its technical report is clearly in the later category. The central part of CTP's ISCDMA technology is algorithms for determining channel usability on a real time basis. Algorithms are not something to be developed in the field. Algorithms are the product of the laboratory and the blackboard. In fact, one presumes that the Commission added the "written showing" alternative to its Rules specifically to take care of software based technologies which can best be developed through theoretical lab work rather than in the field. ISCDMA is a prime example of a technology developed through theoretical analysis and lab work, and which can be well presented through a "written showing."[51]

Once software algorithms are developed by CTP or anyone else, they naturally have to be implemented and tested after implementation. If one reads the TSR study attached,[52] this is all that TSR is suggesting. There is absolutely no implication that the algorithms aren't feasible or won't work. Furthermore, if the Commission concludes a "written showing" of technical feasibility is to be rejected whenever implementation and testing upon implementation is required, the "written showing" alternative becomes meaningless. Every technology with regard to which a "written showing" of technology feasibility is made will eventually have to be implemented and tested after implementation.

The TSR study referred to was the second of three technical reports filed with the Commission. By the time the final of the three studies was conducted with LCC,[53] more development work on ISCDMA had been done by CTP. In the final LCC report there is no suggestion of a need for testing. Thus in the record of this Docket, the Commission has a final technical report which has verified technical feasibility, was prepared in conjunction with LCC, perhaps the leading wireless engineering group in the world, and did not suggest further testing. It is a misconception of the record to interpret the reference to testing in the TSR study as a conclusion on lack of feasibility and to ignore the final study with LCC which did not suggest testing is necessary to establish feasibility. CTP's Petition for Reconsider-

---

[51]On the other hand, the APC/Washington Post FAST approach involves field propagation measurements to validate theoretical propagation mapping and so requires field testing to show technology feasibility. The nature of the technology proposed determines whether a field testing is essential to show technology feasibility.

[52]Exhibit 1, attached.

[53]Exhibit 2, attached.